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ABSTRACT

This paper looks at the amount of students' participation in instances of two common instructional arrangements, whole-class and small-group discussions, in a sixth-grade science class. The purpose is to understand how best to allow girls equitable access to the kinds of social interaction shown to be necessary for science learning. It is first established that although the teacher believes in making room for everyone to talk, girls talk significantly less than boys do in whole class discussions run by this teacher. It is further shown that small groups afford different participation structures than the one-at-a-time talk of the whole class, and that turns are often distributed more equitably in these small groups than in whole class discussion. For each arrangement the paper begins to identify some strategies students use to gain turns at talk. It suggests that the more control these students had in establishing the participation structures, the more equitable was the participation from various students. (Author)

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Small-Group vs. Whole-Class Discussion: Gaining the Floor in Science Lessons[1]

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Abstract

This paper looks at the amount of students' participation in instances of two common instructional arrangements—whole-class and small-group discussions—in a sixth-grade science class. The purpose is to understand how best to allow girls equitable access to the kinds of social interaction shown to be necessary for science learning. It is first established that although the teacher believes in making room for everyone to talk (personal communication, July 1993), girls talk significantly less than boys do in whole class discussions run by this teacher[2]. It is further shown that small groups afford different participation structures than the one-at-a-time talk of the whole-class, and that turns are often distributed more equitably in these small groups than in whole-class discussion. For each arrangement the paper begins to identify some strategies students use to gain turns at talk. It is suggested that the more control these students had in establishing the participation structures, the more equitable was the participation from various students.

Numerous studies of science achievement have reported that, to varying degrees, boys do better in science than girls (Fleming & Malone, 1983; Kulik & Kulik, 1989; Lynn & Hyde, 1989). Given the importance attributed to social interaction as a requisite for learning (Piaget, 1926; Vygotsky, 1978; Newman, Griffin & Cole, 1989), it makes sense to look at classroom participation structures for potential differences in the way girls and boys interact, with each other as well as with the teacher. One specific form of social interaction particularly conducive to learning appears to be conversation.

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[1] An earlier version of this paper was presented at the annual meeting of the American Educational Research Associationon April 7, 1994, in New Orleans, Louisiana.
[2] This imbalance in participation is probably not particular to his classes (see also Spender, 1982).

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The importance of conversations for learning

Several researchers have endorsed *talking science* as a way to learn science (for examples see, Hawkins & Pea, 1987; Lemke, 1990), because it "presumably allows students to understand how the discourse of a field is organized, how viewpoints are presented, and what counts as arguments and support for these arguments" (Chi, de Leeuw, Chiu, & LaVancher, 1992; also see Edwards & Mercer, 1987). Discussions are critical for understanding the meaning of data collected and experiments performed during hands-on science (Newman, in press). Moreover, based on their examination of a number of sixth-grade lessons concerned with seasonal change, Newman, Crowder, & Morrison (forthcoming) claim that "cooperative conversation is an important condition for the development of scientific theorizing in the classroom."

But simple presence in conversations about science is not sufficient for learning scientific concepts. For example, whereas giving explanations to others and to oneself correlates positively with many measures of individual achievement and problem-solving success, receiving explanations has few significant positive effects on achievement (Webb, 1989; Brown & Palincsar, 1989). Ferguson-Hessler and de Jong (1991) found that students who tended to take given information for granted performed poorly, while good students would confront given information with ideas or arguments, doubting its correctness, and most importantly imposing their own structure on it.

If active participation in conversations fosters learning, then given the goal of gender equity in science education the first research question becomes "to what extent do boys and girls have equitable opportunities to participate in classroom science discussions?" This leads to a second research question: "how do students gain their turns at talk?" The first question was relatively

straightforward to answer. Because of the nature of my data, the second question perhaps leads more to issues for further research than it does to findings.

Research Setting

This study grows out of work on a larger project entitled "The Conditions for Sense-making in Science Lessons: Studies of Instructional Interactions and Seasonal Change" funded by the National Science Foundation (NSF, Grant Number MDR 9053609). The project is studying instructional interactions in sixth-grade classrooms—three in large Northeastern cities and two in a predominately white suburb—concerned with the causes of seasonal change.

Though three of the five classrooms participating in the project are within easy commuting distance, I chose to study the Riverside classroom, located in a public school in a city with a wide range of ethnic and economic diversity. The diversity makes it necessary to keep in mind that gender is only one aspect of social identity, and, though I am not looking systematically at them here, race and class certainly play important roles, too. One practical reason for choosing to look at gender is that, unlike socioeconomic status, it is public information (in the sense that most often people *want* others to know their gender), and unlike race which can be—and in this city often is—mixed, people usually fall distinctly into one or the other gender category.

Apart from its diversity, another reason for looking at the Riverside class stems from its teachers' values. The job of teaching in this classroom is shared by a husband and wife, whom I will refer to by the pseudonyms Sam and Toni. They value discussion and hold that students have important things to say to each other (Carter interview, 1992). Because they emphasize collaboration—"get[ting] kids to listen to each other" (Toni, personal communication, 7/93), and "manag[ing] the conversation so that there's room for everyone" (Sam, personal

communication, 7/93)—I felt that in their classroom I would be most likely to attain my eventual goal of finding structures and formats for allowing more balanced participation in classroom conversations.

In 1992-1993, 13 boys and 12 girls comprised this class, though one girl moved away in the middle of the year. Of the boys, 5 were African American (at least two, but possibly three, of them had one white parent), 6 were European American, 1 was Haitian, and 1 was Latino American. Of the girls, 2 were African American (one mixed Senegalese and European American), 6 were European American (including the one who moved away), 2 were Haitian, 1 was Latina American, and 1 was Native American, living with adoptive European American parents. These class data are based in part on information from the teachers, in part from the students themselves in their pre-interviews, and in part from observation.

Turn-taking over time and by gender

The question of who has public speaking rights was important to both the teachers and the researchers for a couple of reasons. First, the teachers clearly thought it was important for students to listen to one another, and for the class to hear from a number of different people.[3] For example, on January 15, Sam and Toni prepared the students to work in small groups. Sam said they should listen to both the quiet and the noisy people in the group "because who knows where the truth will lie."[4] Similarly Toni, seeing some students filling out their assignments before having worked in their groups, warned that they hadn't

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[3] They also indicated this value in an interview with Richard C ter, one of my colleagues at Bolt, Beranek and Newman and Principal Investigator for the project "Empowering Teachers: Mathematics Inquiry Through Technology" (ET-MITT; NSF grant number TPE-9153760).

[4] This is a direct quote. Were I writing it, I might have tried to avoid the ambiguity, but the idea of truth lying, whether intended or not, reflects some interesting skepticism on the part of some class members towards handed-down truths: I heard Nadine say on December 21, 1992, "Books can be deceiving."

experimented with the flashlights and that they hadn't heard what other kids were saying, so they couldn't come up with an answer yet.

Second, the research group sees the opportunity to theorize publicly as an essential component both for acquiring and for demonstrating scientific thinking skills, and as an act that adult scientists perform as part of their own practice. The artifacts that are used as scientific models are largely cultural in origin, for examples, globes, arithmetic procedures and so on, rather than individual cognitive inventions (Brown, et al., in press; Lave, 1988). The cultural origin of these tools makes scientific thinking fundamentally a social process.

In this paper I look at who gets public speaking rights[5] in whole class discussions on three occasions—one each in October, December, and May—and in small group discussions on two occasions, in November and January.

The October lesson lasted approximately 26 minutes. Lisa and Ronald came in about 5 minutes late. Boys obtained 42% of all public turns, contributing 37% of words spoken publicly. Girls obtained 20% of all public turns, contributing 16% of words spoken publicly. Sam had 35% of all public turns and spoke 46% of the public words. The remaining publicly spoken words could not be attributed to particular speakers, mainly because they occurred in very short turns, averaging 3 words each, spoken out of video range. Taking the amount of teacher talk as given, these observed values for student talk are far different from those one would expect if girls and boys participated equitably:

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[5] I give answers to these questions largely in terms of gender, rather than individual students. Partly, the reason for this is that while I am not always sure of which individual is talking when the voice is off-camera, I am usually confident of the speaker's gender, as explained in Chapter 3. Paul I found difficult to distinguish from Lisa and thus I am not one hundred per cent sure, which helps account for unattributed turns. I do not feel comfortable attaching numbers to any individual.

October's observed participation values compared with expected values

	Observed turns	Expected turns	Observed words	Expected words
Teacher	35%		46%	
12 girls	20%	31%	16%	26%
13 boys	42%	34%	37%	28%

Fittingly enough, the December 21st lesson was the shortest of any throughout the year, lasting only 15 minutes. Surprisingly given the proximity of the holidays, everybody was there though Ronald did leave with one minute remaining in the period. Boys obtained 52% of all public turns, contributing 55% of words spoken publicly. Girls obtained 14% of all public turns, contributing 6% of words spoken publicly. Sam had 31% of all public turns and spoke 38% of the public words. The remaining unattributable turns again averaged 3 words each, spoken out of video range. Again taking the amount of teacher talk as given, these observed values for student talk are even further from those one would expect if girls and boys participated equitably than were the observed and expected values of October:

December's observed participation values compared with expected values

	Observed turns	Expected turns	Observed words	Expected words
Teacher	31%		38%	
12 girls	14%	33%	6%	30%
13 boys	52%	36%	55%	32%

A fire-drill took up the last few minutes of the May discussion. The lesson was not continued, even though Sam had listed four girls to speak just before the fire drill. I had my reservations about using such data. How can I know what would have happened? How different might the numbers have been? But since the lesson had already lasted 21 minutes, which was 6 longer than the December

lesson and only 4 shorter than the October lesson, I doubted that much more would have happened. I present the figures for the May lesson, by which time Lisa had moved away, as they obtained in a real world where fire drills do occasionally intercede. Boys obtained 32% of all public turns, contributing 29% of words spoken publicly. Girls obtained 19% of all public turns, contributing 14% of words spoken publicly. Sam had 28% of all public turns and spoke 43% of the public words. Assisting Sam in the teaching of this lesson, Toni had 14% of all public turns and spoke 11% of the public words. The remaining unattributable turns yet again averaged 3 words each, spoken out of video range. May's observed values for student talk still differ from those one would expect if girls and boys participated equitably, but not by as much as they did in October and December:

May's observed participation values compared with expected values

	Observed turns	Expected turns	Observed words	Expected words
Teachers	42%		54%	
11 girls	19%	27%	14%	21%
13 boys	32%	31%	29%	25%

That girls spoke far less than boys overall is quite obvious; girls had only 14% to 20% of all the turns through the three lessons. Just because the percentage of turns that went to girls stayed fairly steady, this does not mean that the number of girls who spoke also stayed steady. In fact, during the October lesson 9 girls spoke, during the December lesson 6 girls spoke, and in the May lesson, 4 girls spoke. This indeed makes it look as though some girls are getting turned off science (c.f. AAUW, 1992).

Gaining turns in whole-class discussions

Because how students obtained their turns was not a question when I was taping, the videotapes give me descriptively inadequate data to exhaustively address this question. I would like to know how many students indicated a desire for a turn compared to how many actually obtained turns. But I cannot see all the students at once, so for example I don't know for sure while one person is talking whether or how many other students had their hands up. I wish I could at least say of the turns that were obtained, how that happened. But if the camera was focused on one area of the room while someone in another area began speaking, I cannot always be sure whether that person had just called out, or if they actually had their hand up before they spoke. Even with better data, cues for gaining turns are very subtle and multimodal. Still, since it is a question that arose from looking at the tapes, I can say a bit qualitatively and quasi-quantitatively about the more obvious strategies that *can* be found there.

Sam nominated students only 22 times in October and 11 times in December. Sam and Toni together nominated students only 13 times in May. Nominations preceded only 8% of both boys' turns and girls' turns. Since girls had so many fewer turns it is not surprising to find that girls received 28% of all the nominations, a lower percentage than would be expected in girls and boys were nominated equitably, but considerably higher than the highest percentage of turns girls ever obtained in a whole-class discussion (20% in October), indicating that girls are somewhat more likely than boys to be called on before speaking.

This does not mean that girls passively waited to be called on. They were more likely than boys to request a nomination. Girls used 5% of their turns just asking for a more substantial, i.e., explanatory, turn. Boys on the other hand used

only 3% of their turns to request a nomination. Such requests I counted as turns, though they had somewhat special status as they were not used to give explanations. Not only were boys more likely to be nominated without requesting a nomination, but when they did make such a request, they had a slightly higher success rate. Thirty-three percent of boys' requests to be nominated succeeded as opposed to 22% of girls' requests. I attribute this at least partially to the fact that boys were three times as likely as girls not only to implore the teacher by calling his name, but to profess to have "something" to say. Each gender succeeded only once in getting a turn by simply calling the teacher's name; an unsuccessful example is number one below. This could explain example six, where Adam rather than Peter got a turn, and partially explain example five, where we see that Moe got a turn when Alan didn't. I say partially, because other factors including that Moe asked first and Alan had already spoken quite a bit were probably at work here, too. Lisa's preliminary turn indicated that she had a question, which is somewhat less assertive than "something to say."

EXAMPLES 1-7:

1. Moe: September was warm and now the sun's go- moving farther away and so the shadows get large, longer and also we get colder.
Kathleen: Sam, Sam, Sam.
Ronald: every, everything's getting +/.

2. Noël: I have something to say.
Sam: I mean Timex watches. Yes?
Noël: I was trying to say about the middle and the hole.

3. Sam: alright +/.
Alan: and also wait, Sam, can I say something?
Sam: yeah.

4. Lisa [hand up]: yeah, but Sam.
Sam: I mean what they count as a solar day is the amount of time you can physically see the sun.
Lisa: Sam.

Sam: yeah?

5. Moe: Sam, can I say something?
Alan: Sam, Sam.
Sam: Moe.

6. Paul: Sam.
Alan: can I now can I respond?
Sam: Alan.

7. Lisa: Sam, I have a question about the sun.
Sam: yeah.
Lisa: How big is it?
Sam: it's uh approximately a million times bigger than the earth. uh we will get back to these questions you have.

Probably the most widely accepted strategy for taking a substantial turn was just to call out[6], which seems to have accounted for 87% of girls' remaining turns and 90% of boys' remaining turns. A reason for this could lie in Sam and Toni's value on the students' talking directly to one another, as Sam said in an interview with my colleague Richard Carter:

The kids are getting up and talking to each other. I think that that's probably very critical to the kids listening more and more to each other is that they're- if they're given many roles where they are the people, you know, they are the ones who are explaining the things, coming up with the theories, whatever and we subtract ourselves from the situation as much as possible uh then they start listening to each other more. Uh I imagine in some situations where the teacher is the uh constant giver of "yes" and "no" answers whatever that the kids don't. You know, why would they listen to each other? And and in uh the situation that we're trying to create is where the kids are talking to each other and convin- you know they're trying to convince each other of their ideas via their experiments and data and whatever.

There did seem to exist noticeable and significant gender differences in another way to obtain what was probably an unwanted turn: go off task. I did not code for this as I might have missed far more cases than I detected, with the

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[6] Certainly all the points I raise could stand hard-core conversation analysis, for things like timing, insertions, breaths, latching and interruptions. Such micro-level analysis was not a question for me when I was transcribing, but even if it had been it is too labor-intensive for this large amount of data.

subtle nature of the cues that a student is off-task, and the fact that not all students are visible on camera at all times. However, I would like to describe a few cases where a boy off-task received attention from the teacher that girls exhibiting similar behavior did not.

On two occasions in the October lesson, off-task behavior seems to have resulted in the classic disciplinary action, where the teacher tries to bring a student into the action. In the following example, Sam asked Lisa a question. When the camera moved to Lisa she was writing on a pad of paper. She stopped and answered his question quite reasonably. As soon as she had finished, the camera shows Cassie pulling Lisa's pad of paper over to herself and writing on it. Lisa appears to have obtained a turn because she had been, actively off-task, writing notes.

Joseph, on the other hand, had been passively off-task, with his right cheek and ear down on the table for most of the time that he was visible on camera. I did not see him indicate in any way that he wanted a turn. Sam's efforts to include Joseph do not seem at first reading too successful; Joseph was clearly confused about which graph the teacher was pointing to, probably because they had been drawn over one another and from the table Joseph would not have seen who drew which.

Sam:	Joseph, what do you think? which of these diagrams makes sense to you with what you have seen and kind of since you've been on the planet and you've been watching the sun for those eleven or twelve years? which which diagram makes any sense to you, or is it kind of a puzzle at this point.
Joseph:	the one going up.
Sam:	this one?
Clifton:	which one?
Sam:	this one.
Joseph:	what do you mean that one?
Sam:	well, which of- peep- people are proposing different paths of the sun. there is a proposal of kind of a triangular path at least the two

sides a lot of people like the arch here, and some people uh Ernesto said well is it possible that it actually has more of this shape where it goes up and then it it stays up for a while and then it starts sinking back down which is a kind of an interesting 'cause a lot of people kind of describe it that way too. Is there one that strikes you as being more correct than the others? Based on kind of what you've noticed.

Joseph: mmm #.
Kathleen: can I try?
Joseph: I don't think it would go up and come back down.
Sam: # you mean this one or this one? you don't think it would do?
Joseph: what do you mean, that one, I don't get what you mean.
Clifton: aaah!

But this exchange did more than reveal that Joseph probably hadn't followed much of went on before. For the rest of the class he sat with his head up.

It is then possible to speculate that students such as Cassie who sit upright and quiet during the entire lesson may not receive any of the teacher's finite attention, which after all is demanded by students clamoring for turns and by boys evidently off-task. Cassie did not get a turn in this lesson.

Consider further that in the very same October lesson Mariette also had her head down, right next to Joseph. Likewise, Kelley lay on the table throughout the December discussion and for parts of the May discussion. Lela, too, kept her head on down on the table during the May discussion. These girls were not called on. This very small sample might suggest that to get a turn it is enough for boys simply to not be on task, as with Joseph, but girls need to go actively off-task as Lisa did by writing notes. This suggestion may also be supported with Toni's expressed concern that Jared was not participating in science class (personal communication). I certainly appreciated that concern and felt that Jared needed such attention. But though Lela's lack of participation in science discussions also concerned me, the teachers did not express a similar concern about her, at least not to me. These all indicate to me that simple non-

participation is seen by the teachers as a bigger problem when it involves boys than when it involves girls. I doubt they would hold such a view consciously.

Participating in Small Groups

Of course, as Edwards and Mercer (1987:7) point out, "one of the most characteristic features of the educational process [is] its mutuality, that it is made up of the interactions between teachers and children." What happens when children work amongst themselves?

Not surprisingly, given the careful selection of these teachers for this study, their expressed philosophy of teaching includes attention to inequities in access to whole-class discussion and to designing activities that might help compensate for those. For example, in an interview with Richard Carter,[7] Sam said he asked the kids what they felt about small groups and they said 'it's nice because we get a better chance to talk.' He continued,

> "And that was one of the things we were worried about with 25 kids...is that we were leaving out- certainly my psychology if there's too many people I take myself out of the action and we saw that happening with some kids and so we were hoping that with smaller groups we would have more kids willing to talk and discuss the stuff that we were looking at."

Providing different activities and working conditions does seem to be one viable way to help different students participate to different extents. The data that I analyzed indicate that whereas a student in a whole-class discussion may have anywhere from 35 to 0 turns, everybody talked in small groups and everybody (even including Darrin, who never participated in the three whole-class lessons) watched the video shown in class.

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[7] Richard Carter interviewed these same teachers early in the 1992-1993 school year about their decision to use small groups in math class. Special thanks to Claire Groden, another researcher on that project, who after hearing me talk about the small group data for this study, lent me the videotape of that interview.

The November Girls' Group: Teacher-ish talk, Criticism, Co-construction, and Takeovers

I wondered what girls could do without male competition for turns. I was surprised to find in all-female group a very different participation structure: co-construction. Co-construction violated the whole-class norm that one speaker at a time would express a complete thought. I found that Cassie and Nadine, infrequent participants in whole-class discussions, participated actively in co-construction. For an example let us look at a small group of four girls from this class who worked together in November of 1992. Before breaking the class into small groups, Toni had charged them with choosing and planning the implementation of an experiment that would show the "path of the sun." Some students had presented ideas for such experiments the week before. Toni helped them reiterate those ideas in the large group, and then gave all the students a worksheet on which to write down their experiment idea, a list of the equipment they would use and an explanation of how this particular experiment would show the path of the sun, in other words how the data could be related to a theory.

Groups self-selected. I chose to videotape a group of four girls: two European-American girls, Kathleen and Ashley, an African American girl, Cassie, and a Haitian girl, Nadine. Though the student teacher sat in with them as they got started, and Toni checked in with them towards the end of the session, they spent the majority of their time alone except for my silent self behind the camera. Over the course of the year, Kathleen had obtained as many as 35 turns in one whole-class lesson and Ashley as many as 14, but Nadine and Cassie had each sat silently through two lessons, and while Cassie had one turn once, Nadine once had 2. But it is clear that Nadine and Cassie spoke much more, and very relevantly, in this small group than they did in whole-class lessons,

obtaining 126 and 125 turns, respectively. Kathleen had 140 turns here and Ashley 80.

Teacherish Talk

I found it particularly interesting that Ashley, a frequent contributor to whole-class discussions, had a difficult time accessing the conversation of this quartet, though she was instrumental in getting it going. She began in a very teacher-ish voice, as if planning to assume a leader's role in this group:

Cassie: I don't like sitting there 'cause there's nothing for me to write on.
Nadine: you- you'll have stuff to write on, let me find these, Cassie.
Ashley: okay! what is our idea?

The girls then spent about two and a half minutes proclaiming in various words that they "don't have an idea." Ashley resumed her task-centered, leadership approach.

Kathleen: well, we don't have an idea.
Nadine: well, that's what we're thinking about.
Student-Teacher: what are you guys thinking about?
Kathleen: an idea.
Ashley: what we're gonna do.
Kathleen: don't step on the trumpet!
Ashley: I like that sundial sort of thing.
Student-Teacher: no, I'm just gener- gently resting my feet.
Kathleen: o:h, I see.
Student-Teacher: uh do you like one of those ideas?
Cassie: no
Ashley: I like the one with the stick and the shadow.
Kathleen: I like mine.
Nadine: yeah, I like the one with the sundial.

Criticism

At this point Cassie began in earnest the role of critic. Her objections and criticisms are important because they don't immediately strike a listener as

cooperative or connected, qualities that are commonly attributed to girls. Skepticism, pointing out possible flaws in an experiment's design, or forcing colleagues to think further about the what-ifs may, however, serve important roles in collaboration. Much as she had done at the beginning in finding Cassie a hard surface for writing on, Nadine then engaged earnestly in solving the problem of what to do without dirt in a backyard.

Nearly five minutes into the small group work, Ashley was still trying to lead the group in practical, task-oriented talk, but having some trouble bypassing Cassie's hypothetical objections. Four turns later, though, Kathleen raised an epistemological objection that earned much more attention than those about there being snow or no sun.

Kathleen:	but that doesn't show the path of the sun, that just shows the way-where the shadows are.
Ashley:	oh oh yeah.
Kathleen:	it doesn't show if the path went in an arc or if it just went like that.
Nadine:	or if it went like that doesn't show-.
Kathleen:	or if it like duhduhduhduhduhduh [sine-wave shaped gesture].
Cassie:	let's do the camera thing, no, not the camera thing, the Don's idea.
Kathleen:	the Don- what was that?
Cassie:	the one where the sun is like +/.
Ashley:	the sun is next to?
Cassie:	you know next to the church.
Nadine:	no, you still- you still can't know Cassie, you can't know if it went-yes you can +/.

Co-construction

With Nadine's turn ("or if it went like that doesn't show -") the nature of the floor, which up to now had been basically one girl speaking one idea at a time, changed. And it is the nature of the floor that seemed to most influence each girl's access to it. By the time the student teacher asked Kathleen to clarify

her objection, Cassie and Nadine also understood it. The three of them co-constructed answers to the student teacher's questions.

Student Teacher: sshh can I interrupt for a second Kathleen are you saying with a shadow it will not you said it would not show the path of the sun?
Kathleen: it will show that it went like that of course, but -.
Cassie: yeah it will show that it went around.
Kathleen: but it won't show whether it went like that -.
Nadine: but it won't show if it went up down up down up down -.
Kathleen: or like that -.
Nadine: or this or whatever.
Kathleen: or like that.
Student Teacher: so you think that no matter what path the sun takes+/.
Cassie: or like boop boop boop.
Student Teacher: the shadow will always be the same?
Kathleen: yeah, no.
Ashley: no!
Cassie: no.
Nadine: no, it won't be the same it will move.
Kathleen: we already know it goes up and then it goes down okay?
Cassie: but we don't -.
Kathleen: but we have to figure out if it goes up like that-.
Nadine: or this -. [Cassie is gesturing, too]
Kathleen: or it goes across like this and then down -.
Cassie: like that -.
Kathleen: or in an arc and that's what.
Ashley: well it goes in an arc.
Nadine: or made a person or whatever.
Kathleen: [leaning toward Ashley] I know that, we have to figure it out, we have to prove it though.

I never did see Ashley co-construct ideas and thus feel it is possible that she simply did not have a way to participate in co-constructed turns. But after all, agreement is necessary for co-constructed turns. So it could be that Ashley did not buy into the task the others were engaged in, that of generating alternative possibilities for the path of the sun. She asserted the "correct answer," that the sun goes in an arc. At that point Kathleen voiced her view of the assignment as a process, where their job was not to get the answer but to figure it out, to prove it.

The following segment of transcript shows the importance of agreement for co-construction. After about twelve minutes of planning, when the girls had finally settled on taking pictures of the sun as a surer way to know its path than marking shadows of a stick, Nadine got an idea about how she could make the stick-and-shadow experiment work. Here it appeared that Ashley and Cassie wanted to co-construct with Nadine, but having not yet explained her idea, Nadine showed little tolerance for their input. Her subsequent turn does not seem to be going where theirs would have. This makes it seem that the "co" of co-construction is very important; co-construction serves to build or extend *one* idea.

Nadine: if we make the stick maybe it will show where the shadow -
Ashley: this is -
Cassie: no, the stick is -
Nadine: let me tell you!
Cassie: no, it wouldn't show.
Nadine: yes, it will, maybe the sun what might be on the tip [=! gestures with pencil] sometimes if you might be there and you mark it on the stick where it went where if it- then you mark it on the floor -

Takeover

Kathleen went to considerable length to take over Nadine's turn, and perhaps her success was due not only to her jumping up, insisting "listen to me, shut up," but also to framing what she was going to say *as though* it was Nadine's idea, even though we will see that it isn't, as Nadine later said "I don't get you."

Kathleen: [=! jumping up] you know what, know what? know what know what ssh listen to me shut up thank you look here's your stick [/] [laughs] here's your stick okay, and I'm the sun and +/.
Nadine: Oh Lord. no here is a stick, see it's a stick.
Kathleen: fine and here is.
Cassie: Nadine.
[Kathleen leans over, looking through the stuff on the shelves to her left, approximately three seconds of silence.]

Ashley:	we should do Moe's idea because it's <an easy idea and it's already been, he's gone
Kathleen:	I need something to be my sun
Nadine:	here is a sun no it was a sun, oh here's the sun.
Cassie:	look take this out here there there's the sun [=! trying to put a round thing in Nadine's hand].
Nadine:	yeah here's the sun.
Ashley:	no.
Cassie:	no, here's the sun, here is the OOW.
Kathleen:	sorry.
Cassie:	there's the sun and here's the stick okay.
Nadine:	oh.
Kathleen:	alright, now gimme sun.
Nadine:	see if the sun went, let me show you!
Kathleen:	I wanna show you something I need someone to be my shadow, someone.
Nadine:	i'll be your shadow. [=! Cassie moves in as if to be the shadow but Nadine makes a stop sign with her left hand]
Kathleen:	you be my shadow okay now here's your sun okay and it's <rising in the east> [singsong] and so where's my shadow.
Nadine:	you're shadow will be right here [=! swooping gesture].
Kathleen:	Right! but what I'm saying is when it's here [=! gesture-marks a place] the shadow is longer [=! drawn out gesture] than when it's here [=! gesture marks a higher sun position] so our circle may +/.
Cassie:	What?
Kathleen:	look.
Nadine:	I don't get you.
Kathleen:	when it's over [=! places "sun" directly over stick] +/.
Cassie:	we don't have to figure out how long] blah blah blah
Kathleen:	listen listen.

Perhaps part of the reason Kathleen's turn was accepted was that she was able to make her competitive grab for a turn—"listen to me shut up thank you, look"—seem like it was going to be cooperative "here's *your* stick, okay." Any distinction between cooperation and competition was blurred again, in the opposite direction, when Cassie and Nadine vied to help Kathleen.

Nadine:	I'll be your shadow. [=! Cassie moves in as if to be the shadow but Nadine makes a stop sign with her left hand]

Kathleen commanded an impressive repertoire, both in this small group and in the whole class. At times, she could genuinely co-construct. At times, she could use the co-construction ethic for her own, perhaps more competitive, ends. And as we have seen just above, she could also use the typical teacherly pattern of Initiation ("where's my shadow?"), Response (Nadine: "your shadow will be right here"), Evaluation ("Right!"), otherwise known as I-R-E (see Cazden, 1988; Mehan, 1979).

Nadine and Cassie both seemed to enjoy the co-constructed floor, when they agreed with the points being made. But we saw Nadine try to prevent co-construction when she apparently felt that her interlocutors were not going to make the same point she wanted to make. And we have seen that Cassie's talk was not always easy to construe as strictly collaborative. More importantly, we saw Cassie and Nadine engage in epistemological, theoretical, and experiment-designing talk similar to that expected in whole-class discussions. It is possible that they preferred co-construction to any of the whole-class participation structures. Or, one could infer that the small group context made a difference to them in terms of either their own willingness to talk or their peers' willingness to listen. It certainly seems likely that they felt safer, or at least less liable to negative assessments, because each of them was able to express non-comprehension as well as their own theories. Such expressions, from anybody, were extremely rare in the three whole-class conversations.

Except when imitating her little brother in giving a reason why they could not work at her house, Ashley did not display any speech style other than the kinds used in the whole class. One time when she really wanted a chance to talk, she complained, "I'm the only one who has my hand raised." To this Kathleen at first replied, "well we're not calling on you" then giggled, and putting her hand in front of Cassie's mouth, nominated Ashley. Here too, Kathleen displayed

strong leadership of the group, her management tactics going even further than a teacher's would. When Ashley did lead the talk, she was clearly in charge. For example, in assuming the leadership role when the girls were working out the logistics of getting together over the holiday weekend to do the experiment, Ashley suggested places and elicited everybody's free times so that they could find a mutually convenient date and location. That Ashley's access differed from that of the others even though she belongs to the same gender, reminds us again that gender is only one aspect of social identity. Since Ashley's access differed from that of the others even though she belongs to the same gender, it raises the questions: to what are the discourse characteristics of this group's members attributable? Culture? Friendship alliances? And are these discourse patterns characteristic of other small group activity? Looking at other small groups of this same class only begins to shed light on these questions.

January Small Groups

A lesson that occurred on January 22, 1993, provides an opportunity to look at the types of participation students engaged in when talking about and doing an "experiment" in small groups of varying gender composition. The class again divided into self-selected small groups, of four students each. The teachers had given everybody a worksheet on which a stick and the endpoints of its shadows over the course of a day appeared on a grid. This drawing represented data that the students had seen and graphed a week earlier when looking at a time-lapse video of a stick and its shadow.

The task of the small groups was to recreate the shadows, using the paper as a guide for where the shadows should end, a golf tee for the stick, and a flashlight as the light source. For convenient reference I am numbering the groups that appeared on the videotape. Group 1 included Emmy, Alan, Cara and

Paul; Group 2 Noël, Rich, Darrin, Joseph; Group 3 D. J., Moe, Ronald; Group 4 Ashley, Kathleen, Kelly and Marisa; Group 5 Don, Nadine, Mary Jane and Mariette.

As evident from the table below, Groups 2 and 3 were the only all-male groups, Group 4 the only all-female group and Group 2 the only single race (all black) group. Groups 1 and 5 were integrated in terms of both gender and race. These groups leave five members of the class unaccounted for: Lela and Cassie, African American females, Ernesto, a Latino, and Jared and Clifton, European American males. Unless only particular pairs of the remaining five were present that day, there could not have been another group of both same race and same gender. Because of the slight preference for self-segregating by gender as opposed to race, one might speculate that gender was the more salient or more important characteristic to the students, at least for this small group science activity.

Because the videotape jumps around from group to group, it is impossible to make fair comparisons in quantity of talk; but here again I find qualitative analyses interesting. I made these analyses through repeated viewings of the videotape and by using video notes that I had made with care approaching that of transcription.

Composition of January Small Groups

	Ethnicity	Gender	spoke in 3 whole-class discussions
• Group 1			
Emmy	European American	female	occasionally
Alan	European American	male	frequently
Cara	Native American	female	never
Paul	European American	male	somewhat frequently
• Group 2			
Noël	Haitian	male	very frequently
Rich	African American	male	occasionally
Darrin	African American	male	never
Joseph	African American	male	very rarely
• Group 3			
D. J.	European American	male	frequently
Moe	European American	male	somewhat frequently
Ronald	African American/ European American	male	frequently
•Group 4			
Ashley	European American	female	frequently
Kathleen	European American	female	very frequently
Kelly	European American	female	rarely
Marisa	Latina	female	occasionally
• Group 5			
Don	African American/ European American	male	somewhat frequently
Nadine	Haitian	female	rarely
Mary Jane	European American	female	frequently
Mariette	Haitian	female	rarely

Different students participate differently in different formats

It is surprising to see on whose terms some of these groups interacted. Group 2, for example contained Noël, one of the recognized brightest students in the class (Toni, personal communication, January 1994), but when the camera arrived at his group he and Darrin had evidently been fooling around with the flashlights and decided to get busy for the camera. They had been interacting on what were probably Darrin's terms, as judged by his lack of engagement in whole-class lessons, rather than on Noël's, despite Noël's higher academic status.[8] And Marisa, the only person of color in her group and only an occasional contributor in whole class discussions, was clearly a leader in Group 4, which happened to include both Kathleen, also identified as one of that year's stars by Toni in January, 1994, and Ashley, a frequent speaker in whole-class discussions.

Distributed tools, distributed cognition

Group 4 began with Ashley, a European American and frequent classroom speaker controlling the flashlight, and Kelly, another European American, complaining about this state of affairs. Marisa didn't need the flashlight to take over the lead of the group; all she needed was an idea. Several things were probably at work here, but two that I think are important and replicable are (1) that the class's culture which valued sense-making, construed to include having and testing out ideas, made Marisa's exclamation more important than Ashley's flashlight or Kelly's complaining and (2) that the members of this group, unlike the members of group 1, gave to and accepted from one another suggestions for how to move the physical objects of the experiment, thereby not tying intellectual roles to physical roles.

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[8] Actually this may not be so surprising, if Labov's 1972 finding that black male teenagers called high academic achievers "lames" still holds. I haven't researched this question.

VIDEO NOTES (Group 4):
Kelly complains if Ashley would let go of the flashlight and give it to me.
Marisa exclaims, oh I've got it, and begins counting squares of graph to determine where Ashley should put flashlight.
Nina asks Marisa to explain theory.
Marisa says that she is counting how many squares the shadow is beside and in front of the stick, and trying to put the flashlight that many squares to the other side and in back of the stick.
Kathleen gives a distance theory
00:58:24 Marisa identifies "angle" as important- It's the angle...you can put it on that dot and tilt it this way or tilt it that way it has to be the right angle.
00:59:21 everyone can write on the paper, too. Ashley says what to write. Kelly and Marisa write. Kathleen declares it confusing.
Kelly takes flashlight.
Kathleen says something is confusing.
Kathleen holds flashlight, too. "I've got it you guys, and my hand is about to fall off."
Marisa says we need to find a more accurate way to record it.
Kathleen says we need to find a way, no we don't we have a way.
Marisa- well our ways don't work.
Kelly moves the paper. Marisa: Kelly, you butt:y!
Kathleen suggests they measure how far the flashlight is from the table (her distance theory). Ashley suggests where it is. Kathleen says and how far away, well no we don't need that.
Ashley moves the paper.
Marisa goes to get tape to tape the paper down.

Negotiating the Terms of Interaction

Groups 1 and 5 began their interactions on terms that would seem more predictable, given my own cultural assumptions--which I think I would share with many North American social scientists—about the dynamics of social power. In Group 5, Mary Jane began controlling the flashlight. She was the only European American in the group, and a more frequent in-class speaker than either of the other girls. Don, of mixed African American and European American parentage, was the only boy in the group, and seemed to be a deputy leader at first, though he does look to the teacher for support. Both he and Mary Jane ignored Nadine's objection.

VIDEO NOTES (Group 5)
01:02:14 Camera moves to another group: Don, Nadine, Mary Jane, Mariette
Mary Jane is arcing the flashlight back and forth, saying this is the path of the sun like this I think.
Nadine says no but wait
Toni asks but how do you account for that..and that [pointing to the last shadows, very long]
Mary Jane does another back and forth movement
Don - the earth is closer to the sun at one point Toni
Toni
Mary Jane says maybe it's higher [this whole time Mary Jane has controlled the flashlight; now Don takes it.]

When the camera first arrived at Group 1, Alan "presented" an explanation to the camera. A European American boy with highly educated parents, he did most of the talking for 90 seconds, though Emmy and Paul did get a couple of words in.

But adult intervention had different effects in each group, perhaps in part because it was sought in Group 5 but not in Group 1. Nina, the teaching assistant, initiated an exchange with Cara in Group 1. Cara never did "fill in the blank" of Nina's making; all that happened was Emmy asked a different, seemingly unrelated question of her own.

VIDEO NOTES (Group 1)
Nina asks Cara what she thinks made the shadow move in the direction that it did.
Cara makes a false start, and Nina rephrases the question
Cara- I think it's because of the sun when it rises and sets it comes in different places and the makes the shadow longer or shorter.
Nina asks her about distance and asks her to recreate the data
Nina points out that Cara wasn't necessarily changing the distance, but something else, works very hard to get Cara to name the difference as "angle", but it doesn't happen.
Emmy says she wants to see how long the shadows are and picks up the flashlight, starts shining it at the tee.

Back in Group 5, Mariette sought Toni's attention for what she was doing, which reduced the task to its essential question: what affects shadow length,

distance or angle? Toni's responsiveness to Mariette's reformulation of the problem helped focus the other group members on Mariette's question as well. Mariette did not get this attention herself even though she had an idea as worthy of group attention as did Marisa in Group 4. When Toni could not get an explanation for *why* Mariette thought her movement of the flashlight was changing the shadow's length, she asked the other students. It looks as if Toni was helping Mariette to share her "cognitive load" with the group. But she kept it Mariette's idea, asking, "how can she do that?" This suggests extending the idea of scaffolding from a technique for cognitive development to include techniques for social development. It looks as though the ability to bring peers' attention and therefore their help to her ideas was right then beyond Mariette's reach; Mary Jane and Don resumed domination of the talk in this group, but Nadine and Mariette kept the flashlight.

VIDEO NOTES (Group 5)
Mariette- see Toni!
Toni- yeah, what am I seeing here?
Mariette has a pencil lying on the paper and is shining a big flashlight sideways at it.
Mariette- see if though you put it far away it's still longer when you put it in closer. but if you put it up here and closer it still gets shorter.
Don- eye level
Toni- because of what?
Mariette- it still gets shorter.
Toni- because why?
pause
Toni- um uh but you said- can you keep it a small shadow and put it far away? [Toni backs out of Mariette's way as she moves the flashlight, looks like almost as far as her arm will extend] is there a way you can do that?
Mary Jane- yes
Toni- how can she do that? ["she" keeping it Mariette's task, giving only a question, not the task to Mary Jane]
Mary Jane- see like this [reaches her hand in front of Nadine who puts the flashlight in it] what how how
Mariette- like this like this
Toni- can she make a short shadow but put her light source far away?
Nadine- yes

Mary Jane- yes see like this
Nadine- if she put it from the top
Mary Jane- like this far away [holding the flashlight at nearly a right angle to the tee.]
Don starts writing on his paper
01:07:32
Toni- kay so what does that say about the closer further thing?
Mary Jane- huh? the closer furth?
Toni- well you all said well maybe this one [pointing to the leftmost dot on the paper, representing the longest shadow] was taken up on the roof and it was closer to the sun.
Mary Jane- I don't think so, I never thought that
Don- it could be the earth. it could've been the earth getting closer to the sun, not since we were closer, the top of the roof was closer
Toni- what do you mean getting closer to the sun?
Don- the path of the earth
Toni- you mean at sometimes the earth goes closer to the sun than at other times?
Don- no,
Nadine takes flashlight from Mariette
Don- it's far away.
Toni- uh huh
Don- it gets closer.
Toni- so it's possible that the earth's path sometimes goes in closer and sometimes it's further?
Don- yes, that's what I want to- from my experience.
[Nadine and Mariette are involved in generating shadows on the tee]
Mary Jane- well it does, while the sun is staying in one place [index finger on table] the earth goes like that [other index finger traces ellipse around the first one] it definitely does. [Mary Jane has resorted to some correct answer knowledge]
Toni- uh huh well what you folks have figured out here is you seem to be manipulating your angle is what you're saying.
Somebody: uhhuh
Toni: alright.

The teacher did a lot of work in this conversation; she not only left Mariette's idea in Mariette's credit, she also told the group that *they* had figured out that angle made the difference. I would think that this has important consequences for the students in terms of thinking of themselves as scientists and in having a good experience during a science lesson. As Newman, Griffin and

Cole (1989) have argued, adults often enculturate children into adult behavior, by interpreting the children's behavior *as if* it were already adult behavior.

Toni's work in this small group seems to illustrate two kinds of scaffolding. In pointing Mary Jane and Don to angle, and in helping them get to questions of what their findings meant, she scaffolded students' cognitive work. But there seems to be a zone of proximal social development as well, and in gaining the group's attention for Mariette, the teacher scaffolded her social interactive work. I have suggested earlier that lack of participation could reflect that words simply are not a particular student's medium, as seemed to be the case for Joseph. Alternatively, a student may lack the social interactive skills for entering into a conversation

In terms of participation then, Group 1 appears to have been the only group where the expected power relationships between European Americans and minorities and between girls and boys actually played out. We begin where we left off last time we saw these four. Unlike Group 4 with Marisa et al, the intellectual leadership here seemed correlated with possession of the flashlight. This led to an interesting power struggle between Emmy and Paul, as seen in her grabs attempting to gain possession of the flashlight. The argument Emmy was trying to make is not quite clear to me, probably an inherent problem when the video jumps around among groups rather than filming one all the way through. Importantly, though, Paul would not accept Emmy's argument, even though she felt she had *shown* him that it works. Nor was it clear that Alan accepted it, saying he needed to experiment. At the point when the camera moved away neither boy had accepted nor refuted Emmy's point.

VIDEO NOTES (Group 1)
Emmy says she wants to see how long the shadows are and picks up the flashlight, starts shining it at the tee.

Alan reads from the worksheet, asking Nina what a question means. He grabs the flashlight out of Emmy's hand at 01:13:28. to which Emmy protests, Hey! and after a couple seconds somebody gives it back to her.
Back to Cara. She just doesn't have the word angle.
01:15:50 Paul says distance doesn't matter cause I can go like that and it still stays the same. [pulling flashlight back along a diagonal]
Emmy- no look [puts hand out as if to receive the flashlight, but resorts to giving Paul directions on how to move the flashlight.]
Paul says he can't keep his hand steady enough, and Emmy makes a more blatant grab for the flashlight but still doesn't get it. She plays off the gesture, bringing her arm down near the paper and saying, yeah but even if you put it down on the table and moved it.
Alan says let's try that and Paul lowers the flashlight to the table. the shadow runs all the way to Emmy's arm. They try putting additional paper down, but can't seem to find where the shadow ends. Alan says the point is that you don't know. Paul says just forget it.
Emmy says here watch Paul and finally at 01:16:43 she regains possession of the flashlight and begins casting shadows with it.
Paul says I don't care okay, you guys can be right, I can be right. He strokes his *Biggest Book of Riddles Around.*
Emmy sets the flashlight down and Alan says hold on, I need to experiment, and he picks up the flashlight
01:17:10 An adult (ethnographer) suggests they set the flashlight on a book (this will make the light lower, but the shadow shorter than having the light right on the table).

That a single group behaved in a way consistent with typical cultural assumptions of power raises the question about the extent to which our cultural assumptions are based on any external reality.

For example, it is commonly claimed that all-female groups work more cooperatively than all-male groups. The most cooperative of the January small groups was the only all-female group (Group 4), but we did see evidence of both cooperation and competition in the November small group, half the members of which incidentally were also half the members of January's group 4. Moreover, the accomplishments of the all-female Group 4 strengthen Madhok's (1992) suggestion that the two-girl group in her study of the effects of gender composition spent so much time off-task more because they did not know what

to do than because of their gender. In fact, the group who might have spent the most time off-task was comprised of three boys—D. J., Moe and Ronald, all fairly frequent speakers in class whom one might expect to have had some idea of what to do—though I'll refrain from making that a definite claim since, partly *because* of their slow progress, the camera only stayed with them for a very short time. More importantly, whereas Madhok (1992) found that in a majority-female group, the three girls deferred to the boy, in Group 5, comprised of three girls and one boy, I found that Mary Jane served as the initial leader, with secondary participation from Don, but with the teacher's help some attention went to Mariette's innovation. This shift of attention seemed to allow for an increase in Nadine's participation as well.

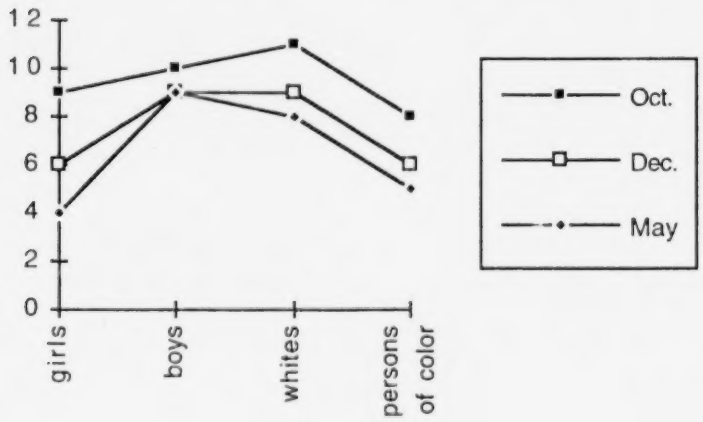
If however, our cultural assumptions do have some basis in fact, then one may speculate that the teachers in this classroom, perhaps this school, have succeeded in challenging the dynamics of stereotyping and power so well that their students can work together in ways that suggest the content of the speech is more important that attributes of the speaker. One particular aspect of classroom culture seemed to be operating in the groups where interaction violated the cultural assumptions about the relative power of members of different gender and race categories. First, it seems clear from Toni's responsiveness to Mariette's reformulation of the task that she endorsed students' asking their own questions and testing them out. Moreover, it seems clear from the way Marisa gained leadership of Group 4 through an idea that at least some of the students in this class also valued asking and investigating their own questions.

In sum, these different formats for talk as well as the different non-verbal activities allowed for participation from different students than seen in whole-class lessons. For example, relatively infrequent contributors to whole-class lessons such as Marisa and Emmy, Nadine and Cassie contributed actively in

small-group talk. In small groups with Nadine and Cassie in November and with Marisa and Kelsey in January, frequent whole-class contributors Ashley and Kathleen were seen to dominate the interaction less. And though Cara never talked in the whole class lessons, she did engage in talk with Nina during small-group work, though this conversation perhaps served more to show that Cara may prefer doing to talking. In unstructured small groups it seems that students created their own and sometimes very different participation structures. These in turn seemed to create opportunities for more students to engage in the science lessons than did the whole-class discussions alone. It would be interesting then to compare participation in such unstructured groups with participation in groups whose members are assigned "roles."

Learning requires a wide range of activities (Lave & Wenger, 1991). Small groups provide a different format and context for acting. The teachers tried to create situations where students had more time to talk to one another, and where each could see and be seen by others as successful. Marisa didn't talk at all in the December whole-class lesson, but she initiated the intellectual leadership of her small group in January. Throughout the seventeen science lessons our group has videotaped, I recall Mariette speaking only once, saying "oh." In the small group, the teacher had an opportunity to try to help Mariette communicate her ideas to peers. Looking at the whole-class data through another lens suggests the importance of noting that both Marisa and Mariette are young women of color.

Participants In Whole Class Lessons by Gender and by Race



Over time, the number of different participants declined, regardless of race or gender. Still, the decline was greater for girls than for boys and for persons of color than for white students. This trend instantiates ubiquitous white male privilege. Though it is not clear from the chart, in each of the three lessons 5 white boys spoke, and only 1 white boy did not. On the other hand, the number of girls, both white and of color, who spoke declined steadily over the three lessons. The number of girls of color who participated in class was consistently lower than the number of white girls who did, despite their nearly equal numbers in the class. Sadly, this seems to support findings cited in the AAUW report that teachers are more likely to ignore black girls than their white classmates. I am aware of far more research on gender issues in science than in cultural issues in science. It seems though that examination of cultural issues in science itself (see Harding, 1991 and Keller, 1985) and in science education is at least as important as the scrutiny currently given to gender issues.

For further research

This paper has shown that girls participated far less than equitably in whole-class discussions. It has also shown that the same girls participated to

different extents in different situations. Overall, small groups afforded opportunities for more equitable participation from their members than did whole-class lessons.

But this paper raised more questions than answers as to how students gain their turns at talk, and perhaps for future research, about how students maintain the turns they do obtain. Part of these could be addressed with more micro-level conversational analysis for such things as pauses and latchings. Some of the questions will remain because the data was not collected with those questions in mind.

Public explanations and science talk are important in their own right. For as Edwards and Mercer (1989:93) write, "[f]or pupils in school, the only knowledge that counts is that which is, or can be, communicated." R. T. Lakoff (1992: 347) further illuminates the nature of communications that count: public ones. What does it mean for girls to make fewer public contributions to science discussions? In making fewer of the kinds of contributions that will be remembered—public ones—are girls thus perceived and do they perceive themselves as less capable or less knowledgeable in science? Or in making fewer of the kinds of contributions for which they will be held responsible, public ones, they may—as Lela did (Théberge, 1994)—refuse to align themselves with an ideology to which they do not subscribe (Feyerabend, 1988).

Science education aside, the question of who has the floor is an important one. Language is a resource and as with any material resource, its use *should* be, but usually is not, distributed justly among those who want it. When a resource is distributed unevenly, we perpetuate an imbalance of power. For users of language this has serious consequences, as those whose use of it is legitimated are more able to impose their meanings on those whose use of language is not legitimated (Spender, 1980:5).

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